

JC07 Rec'd PCT/PTO 08 FEB 2002

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

11709.51USWO

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)

Unknown

10/049174

INTERNATIONAL APPLICATION NO.

PCT/SE00/01559 ✓

INTERNATIONAL FILING DATE

August 9, 2000 ✓

PRIORITY DATE CLAIMED

September 6, 1999 ✓

TITLE OF INVENTION

DEVICE AT A PLATE FORMING TOOL ✓

APPLICANT(S) FOR DO/EO/US

NORDVALL, Per ✓

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
- a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
- b. ☒ has been transmitted by the International Bureau.
- c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
- a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
- b. ☐ have been transmitted by the International Bureau.
- c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
- d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98, Form 1449, 5 References.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment, Marked-up claims pages, abstract.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: Recordation Form Cover Sheet, Application Data Sheet, Form PCT/ISA/210, Form PCT/IPEA/409, International Publication Page of WO 01/17708.

10/049174

JC10 Rec'd PCT/PTO 08 FEB 2002

S/N unknown

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	NORDVALL	Docket No.:	11709.51USWO
Serial No.:	unknown	Filed:	concurrent herewith
Int'l Appln No.:	PCTSE0001559	Int'l Filing Date:	August 9, 2000
Title:	DEVICE AT A PLATE FORMING TOOL		

CERTIFICATE UNDER 37 CFR 1.10

'Express Mail' mailing label number: EV 036307901 US

Date of Deposit: February 8, 2002

I hereby certify that this correspondence is being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

By: 

Name: Chris Stordahl

PRELIMINARY AMENDMENT

Box PCT
Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

In connection with the above-identified application filed herewith, please enter the following preliminary amendment, which is based, a copy of which is enclosed herewith:

IN THE ABSTRACT

Insert the attached Abstract page into the application as the last page thereof.

IN THE SPECIFICATION

A courtesy copy of the present specification is enclosed herewith. However, the World Intellectual Property Office (WIPO) copy should be relied upon if it is already in the U.S. Patent Office.

IN THE CLAIMS

Please amend the claims as follows:

3. (Amended) Arrangement according to claim 1, **characterised in that** each wheel (5a) is enclosed by a housing (8), from which only a fraction of each wheel (5a) protrudes through an opening (10) facing the running surfaces (5c).

4. (Amended) Arrangement according to claim 1, **characterised in that** the opening (10) lies substantially close up to each wheel (5a).

5. (Amended) Arrangement according to claim 1, **characterised in that** the shaft (5b) is fixed to the part (2) designed with the forming or machining element (6), and that the wheels (5a) are rotatably supported on the shaft (5b).

6. (Amended) Arrangement according to claim 1, **characterised in that** the shaft (5b) is fixed to the part (4) fixed to a stand, and that the wheels (5a) are rotatably supported on the shaft (5b).

7. (Amended) Arrangement according to claim 1, **characterised in that** a sealing arrangement (9) is designed to form a seal between the first part (2) and the second part (4) and to substantially enclose the above-mentioned fraction of each wheel (5a).

8. (Amended) Arrangement according to claim 1, **characterised in that** the arrangement (9) comprises a U-shaped seal (9b) arranged on the second part (4) and an I-shaped seal (9a), arranged on the first part (2) and extending between the legs of the U-shaped seal (9b).

9. (Amended) Arrangement according to claim 1, **characterised in that** the distance between the parts (2, 4) is less than the thickness of the sheet (1).

10. (Amended) Arrangement according to claim 1, **characterised in that** the radial distance between the peripheral surface of each wheel (5a) and its pivot bearing (5d) is greater than the distance between the parts (2, 4).

REMARKS

The above preliminary amendment is made to remove multiple dependencies from claims 3, 4, 5, 6, 7, 8, 9, 10.

A new abstract page is supplied to conform to that appearing on the publication page of the WIPO application, but the new Abstract is typed on a separate page as required by U.S. practice.

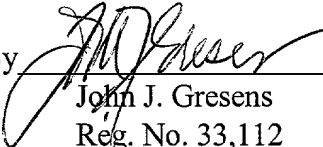
Applicants respectfully request that the preliminary amendment described herein be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, John J. Gresens (Reg. No. 33,112), at (612) 371.5265.

Respectfully submitted,

MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, Minnesota 55402-0903
(612) 332-5300

Dated: February 8, 2002

By _____
John J. Gresens
Reg. No. 33,112

JJGresens/nel

ABSTRACT
PCT/WO 01/17708

DEVICE AT A PLATE FORMING TOOL

Arrangement in a sheet-metal forming tool (7) comprising a first part (2) for performing a reciprocating movement in relation to a second part (4) fixed to a stand. The first part (2) has an element (6) for forming or machining a held sheet (1) by means of a drive arrangement (3). There is a bearing between the parts (2, 4) which has at least one wheel (5a) on a shaft arranged on one of the parts (2). On the remaining part (4) there is a running surface (5c) for the said wheel (5a), the said surface facing the wheel (5a) and defining the movement of the first part (2).

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3. Arrangement according to [either of the preceding claims] claim 1, **characterised in that** each wheel (5a) is enclosed by a housing (8), from which only a fraction of each wheel (5a) protrudes through an opening (10) facing the running surfaces (5c).

4. Arrangement according to [any of the preceding claims] claim 1, **characterised in that** the opening (10) lies substantially close up to each wheel (5a).

5. Arrangement according to [any of the preceding claims] claim 1, **characterised in that** the shaft (5b) is fixed to the part (2) designed with the forming or machining element (6), and that the wheels (5a) are rotatably supported on the shaft (5b).

6. Arrangement according to [any of the preceding claims 1-4] claim 1, **characterised in that** the shaft (5b) is fixed to the part (4) fixed to a stand, and that the wheels (5a) are rotatably supported on the shaft (5b).

7. Arrangement according to [any of the preceding claims] claim 1, **characterised in that** a sealing arrangement (9) is designed to form a seal between the first part [92]) (2) and the second part (4) and to substantially enclose the above-mentioned fraction of each wheel (5a).

8. Arrangement according to [any of the preceding claims] claim 1, **characterised in that** the arrangement (9) comprises a U-shaped seal (9b) arranged on the second part (4) and an I-shaped seal (9a), arranged on the first part (2) and extending between the legs of the U-shaped seal (9b).

9. Arrangement according to [any of the preceding claims] claim 1, **characterised in that** the distance between the parts (2, 4) is less than the thickness of the sheet (1).

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10. Arrangement according to [any of the preceding claims] claim 1,
characterised in that the radial distance between the peripheral surface of each wheel
(5a) and its pivot bearing (5d) is greater than the distance between the parts (2, 4).

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Device at a plate forming tool

The present invention relates to an arrangement in a sheet-metal forming tool according to the pre-characterising clause of claim 1.

Supporting a moveable part in a sheet-metal forming tool by means of a plain bearing or by getting rollers to roll between two plane surfaces was previously known. The said bearings have proved prone to heavy wear and to loss of repeat accuracy, especially in a direction in which they are subjected to the heaviest loading. The environment to which the sheet-metal forming tool is exposed is often dirty, especially in the motor industry. A sheet that is to be formed is in many cases coated with a lubricant with good adhesion properties prior to sheet metal forming and residual lubricant runs into inappropriate places. Particles from the sheet-metal working find their way, among other things, into bearings, where they do not belong. The lubricant sometimes lacks the characteristics of a good bearing lubricant and thereby degrades a film of lubricant present in the bearing when the two lubricants become mixed. A poor lubricating film increases the risk of damage to the bearing. The lubricant also acts as a carrier of the particles that inherently increase the bearing wear and reduce the repeat accuracy. Plain bearing constructions and constructions with two plane surfaces with rollers between them require a large bearing surface in order to function well under high bearing loads. The size of a plain bearing is also determined by the length of a slide movement, which means that the said constructions take up a lot of space.

EP-A1-370 582 shows various types of bearing, for example plain bearing, roller bearing and ball and socket bearing. However, it is not shown how an arrangement capable of solving or at least reducing the problem described above might be produced.

An object of the present invention is to produce an arrangement, which will eliminate or at least reduce the problem described above. This is achieved by an arrangement according to the characterising part of claim 1.

Preferred embodiments have, in addition, any or some of the characteristics specified in the subordinate claims.

The invention will be explained in more detail with the aid of the drawing attached, which illustrates examples of embodiments of the arrangement according to the present invention.

- Fig. 1 shows a diagram of an example of the arrangement designed for flanging, in contact with a held sheet.
- Fig. 2 shows an example of the arrangement designed for cutting, in contact with a held sheet.
- Fig. 3 shows a diagram of an arrangement according to the invention with a drive source exemplified by a hydraulic drive unit.
- Fig. 4 describes an example of a sealing arrangement enclosing a part of the wheels in a view looking at the moveable part in figure 3 from below, together with the U-shaped seal inset in the figure, for the sake of clarity.
- Fig. 5 shows a diagrammatic section through the moveable part in the preferred embodiment, see section A-A in figure 3.
- Fig. 6 shows an example of an alternative embodiment with the wheels located in a part fixed to a stand.
- Fig. 7 shows an example of a cut-away diagrammatic view of the first part in an advanced position.
- Fig. 8 shows an example of a bearing according to the invention.
- Fig. 9 shows an example of a sealing arrangement according to the invention.

Examples of operations, which the arrangement according to the invention is designed to perform, are shown in figure 1 and figure 2. Other operations, which the arrangement is designed to perform and which are not shown in the drawing, include hole-making, for example, the arrangement being especially suited to hole-making where the perpendicular line of the sheet metal does not coincide with the direction of movement of the arrangement.

In figure 1, 1 denotes a held sheet. A first part 2 is designed, during an advancing movement, to flange or form a part of the sheet 1 by means of a sheet-metal forming force obtained from a drive unit 3. Beneath the first part in figure 1 there is a second part 4 fixed to a stand and designed to support the first part 2 by way of a bearing 5. The distance between the parts 2, 4 is small, for example 0.3-3.0 mm. The drive unit, which

in figure 3 is exemplified by a hydraulic unit, may alternatively take the form of a cam unit or roller cam unit (not shown). When a reaction force from the sheet 1, perpendicular to the direction of movement, occurs on the first part 2, this is absorbed by the bearing 5 and the second part 4 fixed to a stand, which second part can be clearly
5 seen from figure 2. An example of the bearing 5 is shown in figure 8 and comprises a fixed shaft 5b with two rotatably mounted wheels 5a. The wheels 5a are arranged at the ends of the shaft 5b. A pivot bearing 5d is arranged between each wheel 5a and the shaft 5b. A part indicated by 6 is designed to be interchangeable, depending on the current operation.

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The peripheral surface of the wheels 5a is hardened and is in contact with a running surface 5c, along which the wheels 5a are designed to run. The radial extent of the wheels 5a between their respective pivot bearings 5d and peripheral surfaces is large enough to ensure that dirt, lubricant and other particles present on the running surfaces
15 5c can reach the pivot bearings 5d of the wheels 5a only with difficulty. A radial extent greater than the distance between the parts 2, 4, that is approximately 3 mm or more, is to be preferred. In practical trials with two wheels and a simulated sheet metal force of 44 kN a radial extent of 10 mm has proved to work satisfactorily.

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A housing 8 surrounds each wheel 5a. Each housing 8 has an opening 10, which faces each running surface 5c. Only a fraction of the wheels 5a protrude out through each opening 10, as is shown in figure 7. The fact that the wheels 5a lie close up to the opening means that dirt, lubricant and other particles cannot easily reach the pivot bearings 5d.

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The running surfaces 5c are two surfaces of a hardened sheet metal facing the wheels 5a and the opening 10 and connected to and substantially embedded in the second part 4. The upper surfaces of the second part 4 and the running surfaces 5c lie substantially in the same plane. The sheet 5e and hence also the running surfaces 5c are enclosed by a
30 sealing arrangement 9, which makes it more difficult for dirt, lubricant and other particles to get in between the parts 2, 4 and in between the wheels 5a and the running surfaces 5c and further to the pivot bearings 5d. The arrangement 9 comprises a U-shaped seal 9b and an I-shaped seal 9a. The ends of the I-shaped seal 9a lie close up to the insides of the legs of the U-shaped seal 9b and are designed to run between them.
35 Together with the lower surface of the first part 2 and the upper surface of the second part 4, the two seals 9a, 9b thus form a substantially enclosed space, which surrounds the running surfaces 5c and that part of the wheels 5a that protrudes out of the housing 8.

It will be obvious that the invention can be modified in many ways within the scope of the invention. Thus in an alternative embodiment the shaft 5b is rotatably fixed to the first part 2 and the wheels 5a are firmly mounted on the shaft 5b. In a further embodiment the bearing 5 comprises only one wheel 5a, which is then significantly wider than either of the two wheels 5a. In yet another alternative embodiment a plurality of wheels 5a is arranged on the same shaft 5b or alternatively a plurality of shafts 5b with two wheels 5a, or in a combination of the said embodiments.

In another alternative embodiment the wheels 5a are located in the second part 4, see figure 6, the running surfaces 5c being arranged in the first part 2.

In yet another embodiment just one housing 8 encloses all the wheels 5a.

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Claims

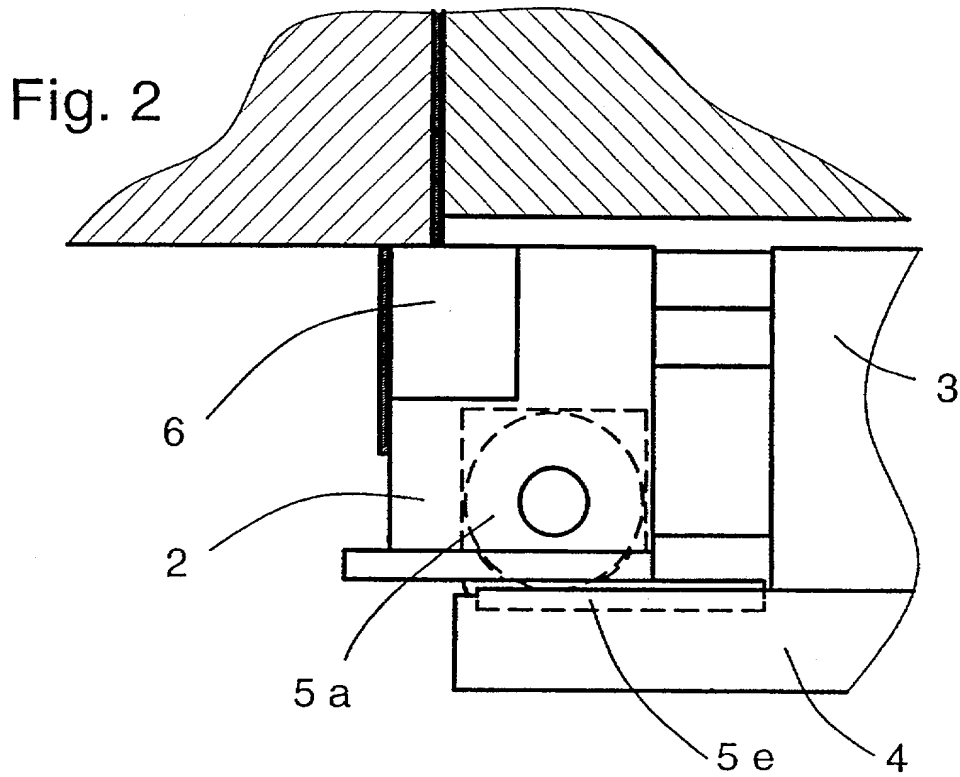
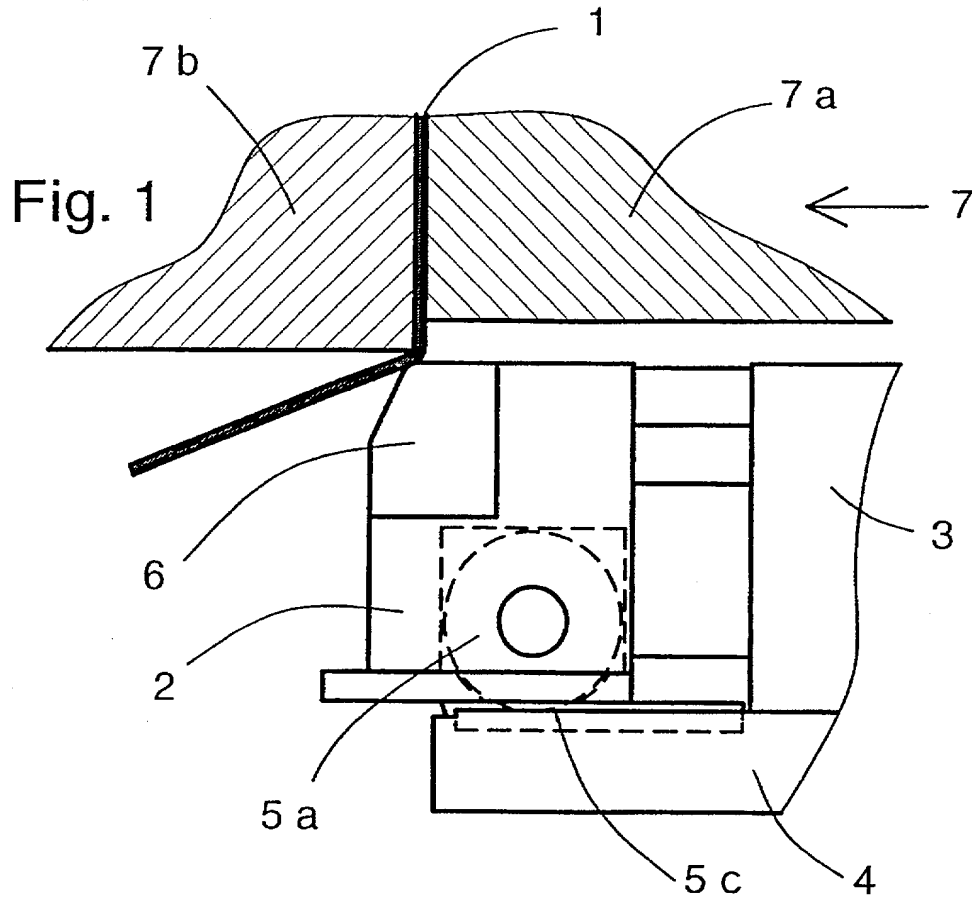
1. Arrangement in a sheet-metal forming tool (7) comprising a first part (2) for performing a reciprocating movement, produced by means of a drive arrangement (3), in relation to a second part (4) fixed to a stand, and a bearing (5) arranged between the parts, of which the first part (2) has elements (6) for forming or machining a held sheet (1) **characterised in that** the bearing (5) comprises at least one wheel (5a) on a shaft (5b) arranged on one of the parts (2) and a running surface (5c) for the said wheel (5a) on the remaining part (4), the said surface facing the wheel (5a) and defining the movement of the first part (2).
2. Arrangement according to claim 1, **characterised in that** there are at least two wheels (5a) on the shaft (5b) arranged at a distance from one another.
3. Arrangement according to either of the preceding claims, **characterised in that** each wheel (5a) is enclosed by a housing (8), from which only a fraction of each wheel (5a) protrudes through an opening (10) facing the running surfaces (5c).
4. Arrangement according to any of the preceding claims, **characterised in that** the opening (10) lies substantially close up to each wheel (5a).
5. Arrangement according to any of the preceding claims, **characterised in that** the shaft (5b) is fixed to the part (2) designed with the forming or machining element (6), and that the wheels (5a) are rotatably supported on the shaft (5b).
6. Arrangement according to any of claims 1-4, **characterised in that** the shaft (5b) is fixed to the part (4) fixed to a stand, and that the wheels (5a) are rotatably supported on the shaft (5b).
7. Arrangement according to any of the preceding claims, **characterised in that** a sealing arrangement (9) is designed to form a seal between the first part (2) and the second part (4) and to substantially enclose the above-mentioned fraction of each wheel (5a).
8. Arrangement according to any of the preceding claims, characterised in that the arrangement (9) comprises a U-shaped seal (9b) arranged on the second part (4) and an I-shaped seal (9a), arranged on the first part (2) and extending between the

legs of the U-shaped seal (9b).

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9. Arrangement according to any of the preceding claims, **characterised in that** the distance between the parts (2, 4) is less than the thickness of the sheet (1).
10. Arrangement according to any of the preceding claims, **characterised in that** the radial distance between the peripheral surface of each wheel (5a) and its pivot bearing (5d) is greater than the distance between the parts (2, 4).

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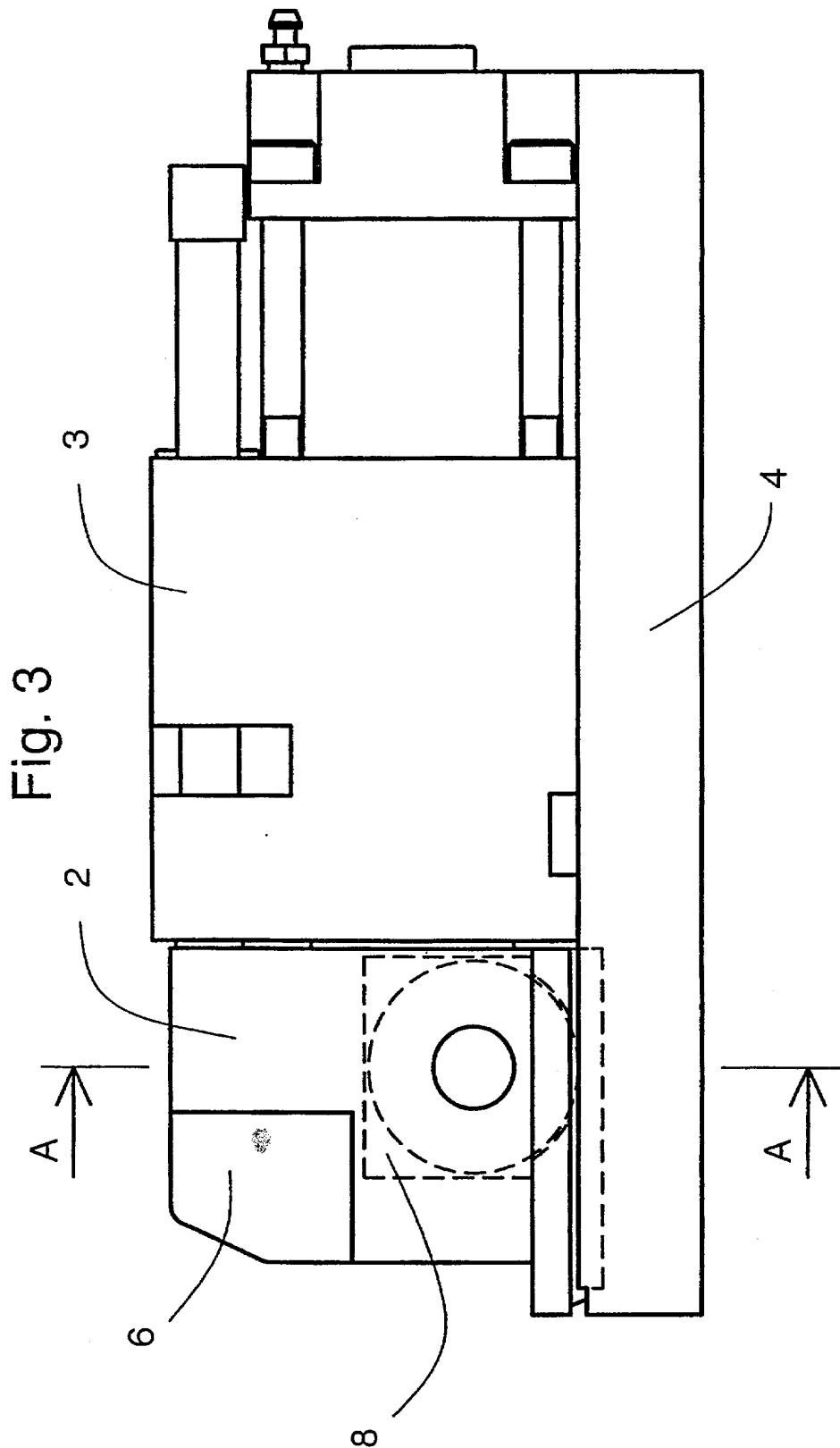


Fig. 4

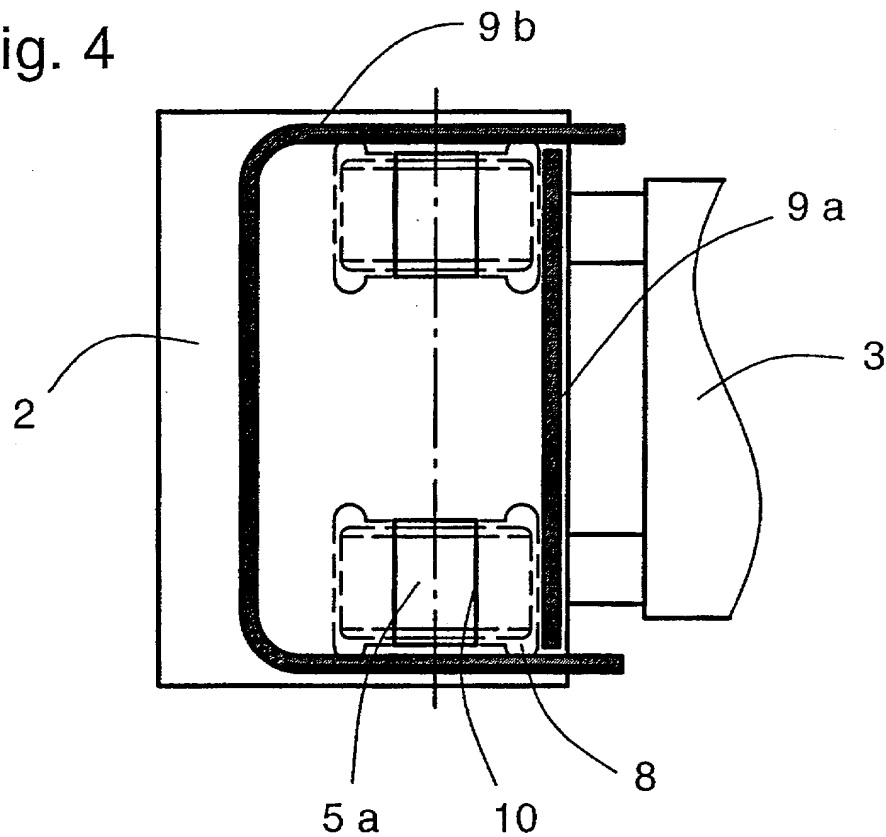


Fig. 5

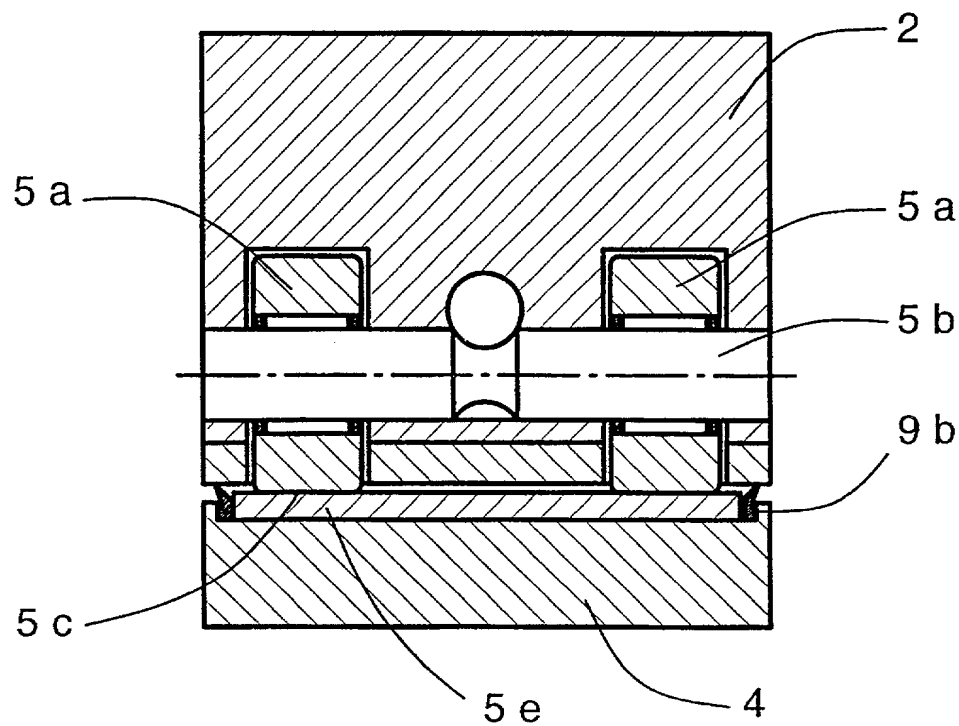


Fig. 6

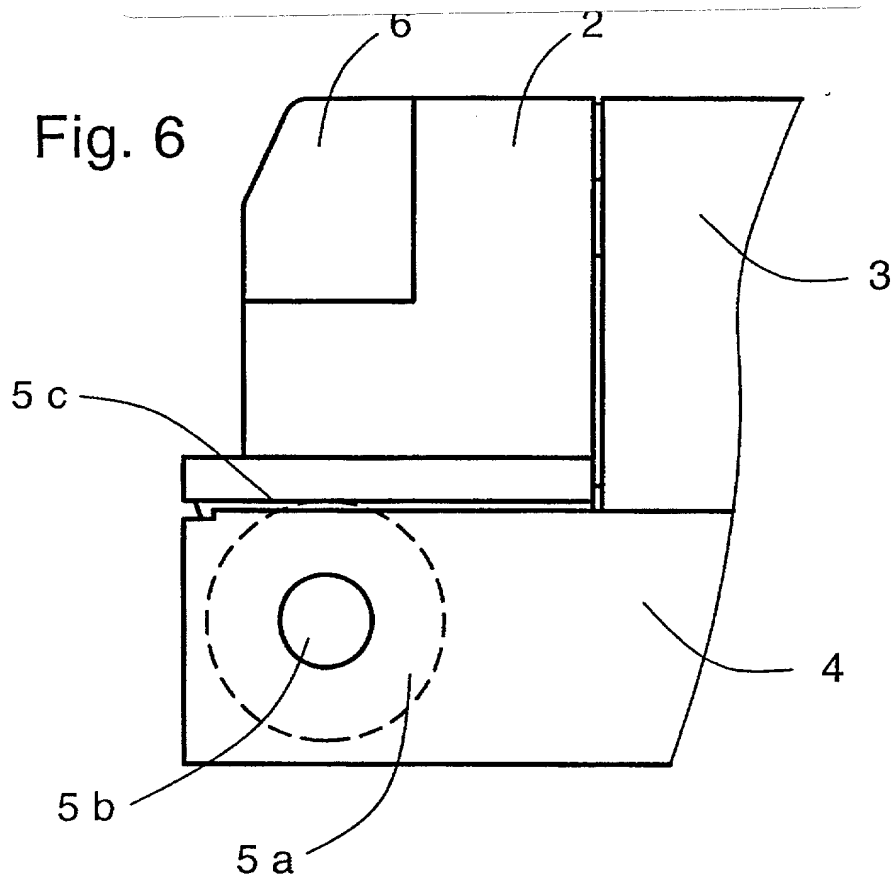


Fig. 7

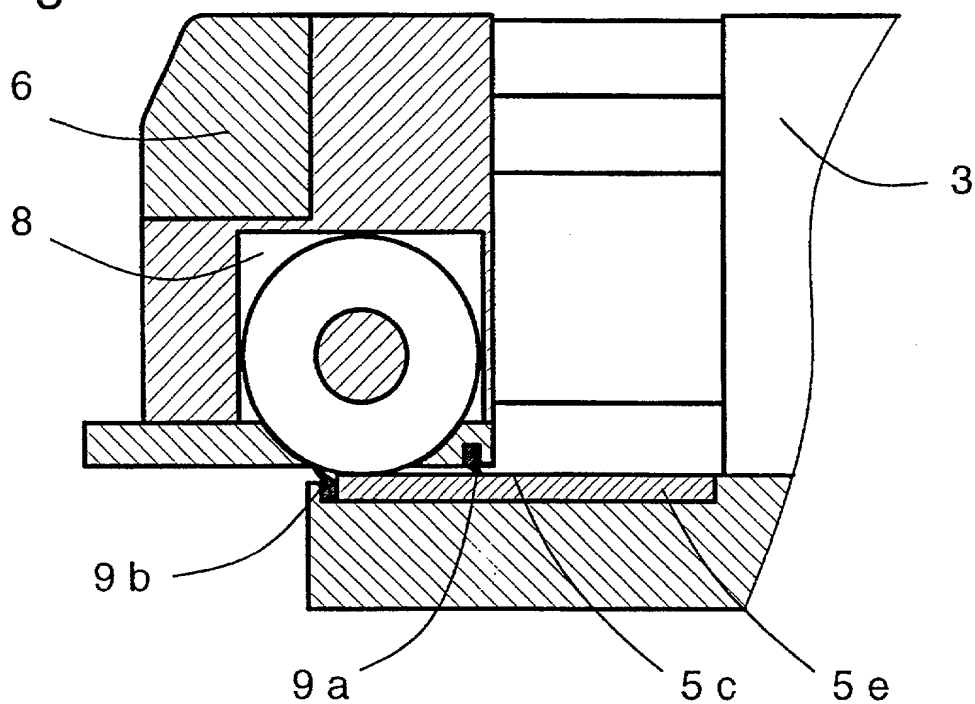


Fig. 8

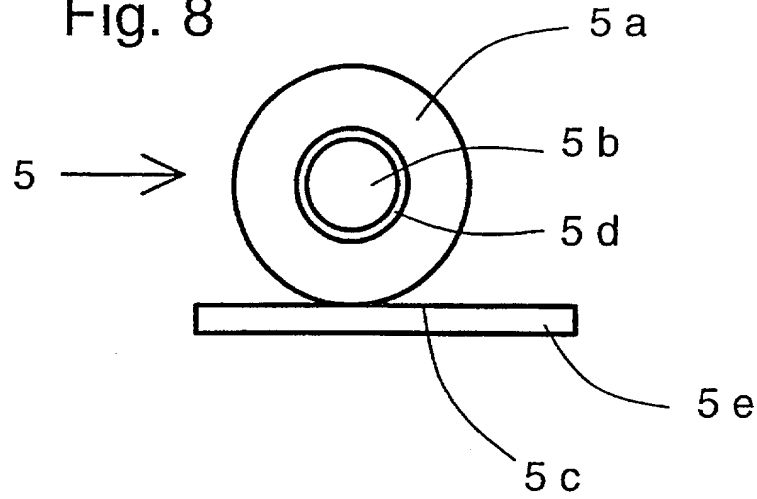
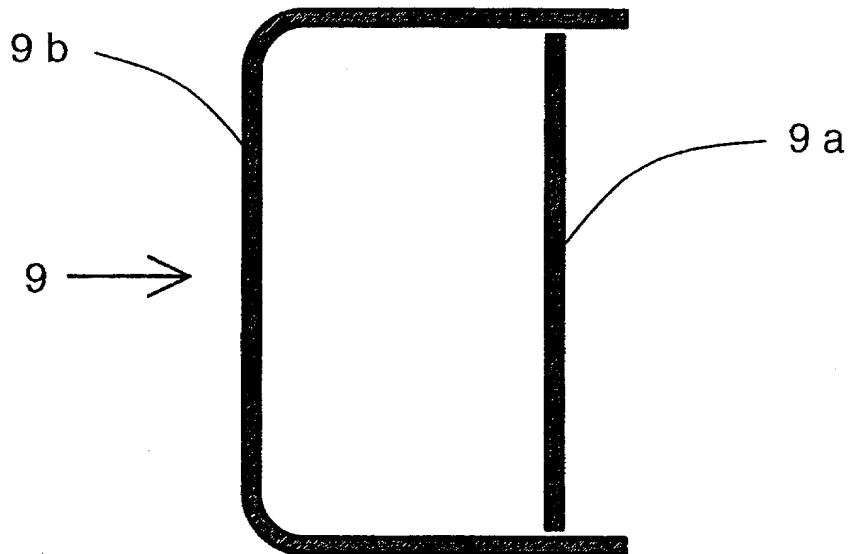


Fig. 9



MERCHANT & GOULD P.C.

United States Patent Application

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **DEVICE AT A PLATE FORMING TOOL**

The specification of which

- a. ☐ is attached hereto
b. ☒ was filed on _____ as application serial no. _____ and was amended on _____ (if applicable) (in the case of a PCT-filed application) described and claimed in international no. PCT/SE00/01599 filed _____ and as amended on _____ (if any), which I have reviewed and for which I solicit a United States patent.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

- a. ☐ no such applications have been filed.
b. ☒ such applications have been filed as follows:

FOREIGN APPLICATION(S), IF ANY, CLAIMING PRIORITY UNDER 35 USC § 119

COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	DATE OF ISSUE (day, month, year)
SWEDEN	9903143-7 ✓	06/SEPTEMBER/1999 ✓	

ALL FOREIGN APPLICATION(S), IF ANY, FILED BEFORE THE PRIORITY APPLICATION(S)

COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	DATE OF ISSUE (day, month, year)

I hereby claim the benefit under Title 35, United States Code, § 120/365 of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

U.S. PROVISIONAL APPLICATION NUMBER	DATE OF FILING (Day, Month, Year)

I hereby appoint the following attorney(s) and/or patent agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith:

Albrecht, John W.	<u>Reg. No. 40,481</u>
Ali, M. Jeffer	<u>Reg. No. 46,359</u>
Altera, Allan G.	<u>Reg. No. 40,274</u>
Anderson, Gregg I.	<u>Reg. No. 28,828</u>
Batzli, Brian H.	<u>Reg. No. 32,960</u>
Beard, John L.	<u>Reg. No. 27,612</u>
Berns, John M.	<u>Reg. No. 43,496</u>
Branch, John W.	<u>Reg. No. 41,633</u>
Brown, Jeffrey C.	<u>Reg. No. 41,643</u>
Bruess, Steven C.	<u>Reg. No. 34,130</u>
Byrne, Linda M.	<u>Reg. No. 32,404</u>
Campbell, Keith	<u>Reg. No. 46,597</u>
Carlson, Alan G.	<u>Reg. No. 25,959</u>
Caspers, Philip P.	<u>Reg. No. 33,227</u>
Clifford, John A.	<u>Reg. No. 30,247</u>
Cook, Jeffrey	<u>Reg. No. 48,649</u>
Daignault, Ronald A.	<u>Reg. No. 25,968</u>
Daley, Dennis R.	<u>Reg. No. 34,994</u>
Daulton, Julie R.	<u>Reg. No. 36,414</u>
DeVries Smith, Katherine M.	<u>Reg. No. 42,157</u>
DiPietro, Mark J.	<u>Reg. No. 28,707</u>
Doscotch, Matthew A.	<u>Reg. No. P-48,957</u>
Edell, Robert T.	<u>Reg. No. 20,187</u>
Epp, Ryan, Sandra	<u>Reg. No. 39,667</u>
Glance, Robert J.	<u>Reg. No. 40,620</u>
Goff, Jared S.	<u>Reg. No. 44,716</u>
Gougin, Matthew J.	<u>Reg. No. 44,125</u>
Golla, Charles E.	<u>Reg. No. 26,896</u>
Gorman, Alan G.	<u>Reg. No. 38,472</u>
Gould, John D.	<u>Reg. No. 18,223</u>
Gregson, Richard	<u>Reg. No. 41,804</u>
Gressens, John J.	<u>Reg. No. 33,112</u>
Hammer, Samuel A.	<u>Reg. No. 46,754</u>
Hamre, Curtis B.	<u>Reg. No. 29,165</u>
Harrison, Kevin C.	<u>Reg. No. 46,759</u>
Hertzberg, Brett A.	<u>Reg. No. 42,660</u>
Hinson, Randall A.	<u>Reg. No. 31,838</u>
Holzer, Jr., Richard J.	<u>Reg. No. 42,668</u>
Hope, Leonard J.	<u>Reg. No. 44,774</u>
Jardine, John S.	<u>Reg. No. P-48,835</u>
Johns, Nicholas P.	<u>Reg. No. 48,995</u>
Johnston, Scott W.	<u>Reg. No. 39,721</u>
Kadievitch, Natalie D.	<u>Reg. No. 34,196</u>
Kaseburg, Frederick A.	<u>Reg. No. 47,695</u>
Kettelberger, Denise	<u>Reg. No. 33,924</u>
Keys, Jeramie J.	<u>Reg. No. 42,724</u>
Knearl, Homer L.	<u>Reg. No. 21,197</u>
Kowalchyk, Alan W.	<u>Reg. No. 31,535</u>
Kowalchyk, Katherine M.	<u>Reg. No. 36,848</u>
Lacy, Paul E.	<u>Reg. No. 38,946</u>
Larson, James A.	<u>Reg. No. 40,443</u>

Leonard, Christopher J.	<u>Reg. No. 41,940</u>
Liepa, Mara E.	<u>Reg. No. 40,066</u>
Lindquist, Timothy A.	<u>Reg. No. 40,701</u>
Lown, Jean A.	<u>Reg. No. 48,428</u>
Mayfield, Denise L.	<u>Reg. No. 33,732</u>
McDonald, Daniel W.	<u>Reg. No. 32,044</u>
McIntyre, Jr., William F.	<u>Reg. No. 44,921</u>
Mueller, Douglas P.	<u>Reg. No. 30,300</u>
Nelson, Anna M.	<u>Reg. No. 48,935</u>
Paley, Kenneth B.	<u>Reg. No. 38,989</u>
Parsons, Nancy J.	<u>Reg. No. 40,364</u>
Pauly, Daniel M.	<u>Reg. No. 40,123</u>
Phillips, John B.	<u>Reg. No. 37,206</u>
Pino, Mark J.	<u>Reg. No. 43,858</u>
Prendergast, Paul	<u>Reg. No. 46,068</u>
Pytel, Melissa J.	<u>Reg. No. 41,512</u>
Qualey, Terry	<u>Reg. No. 25,148</u>
Reich, John C.	<u>Reg. No. 37,703</u>
Reiland, Earl D.	<u>Reg. No. 25,767</u>
Samuels, Lisa A.	<u>Reg. No. 43,080</u>
Schmaltz, David G.	<u>Reg. No. 39,828</u>
Schuman, Mark D.	<u>Reg. No. 31,197</u>
Schumann, Michael D.	<u>Reg. No. 30,422</u>
Scull, Timothy B.	<u>Reg. No. 42,137</u>
Sebald, Gregory A.	<u>Reg. No. 33,280</u>
Skoog, Mark T.	<u>Reg. No. 40,178</u>
Spellman, Steven J.	<u>Reg. No. 45,124</u>
Stewart, Alan R.	<u>Reg. No. 47,974</u>
Stoll-DeBell, Kirstin L.	<u>Reg. No. 43,164</u>
Sullivan, Timothy	<u>Reg. No. 47,981</u>
Sumner, John P.	<u>Reg. No. 29,114</u>
Swenson, Erik G.	<u>Reg. No. 45,147</u>
Tellekson, David K.	<u>Reg. No. 32,314</u>
Trembath, Jon R.	<u>Reg. No. 38,344</u>
Tunheim, Marcia A.	<u>Reg. No. 42,189</u>
Underhill, Albert L.	<u>Reg. No. 27,403</u>
Vandenburgh, J. Derek	<u>Reg. No. 32,179</u>
Wahl, John R.	<u>Reg. No. 33,044</u>
Weaver, Paul L.	<u>Reg. No. 48,640</u>
Welter, Paul A.	<u>Reg. No. 20,890</u>
Whipps, Brian	<u>Reg. No. 43,261</u>
Whitaker, John E.	<u>Reg. No. 42,222</u>
Wier, David D.	<u>Reg. No. P-48,229</u>
Williams, Douglas J.	<u>Reg. No. 27,054</u>
Withers, James D.	<u>Reg. No. 40,376</u>
Witt, Jonelle	<u>Reg. No. 41,980</u>
Wong, Thomas S.	<u>Reg. No. 48,577</u>
Wu, Tong	<u>Reg. No. 43,361</u>
Young, Thomas	<u>Reg. No. 25,796</u>
Zeuli, Anthony R.	<u>Reg. No. 45,255</u>

I hereby authorize them to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/ organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct Merchant & Gould P.C. to the contrary.

I understand that the execution of this document, and the grant of a power of attorney, does not in itself establish an attorney-client relationship between the undersigned and the law firm Merchant & Gould P.C., or any of its attorneys.

I acknowledge the duty to disclose information that is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56 (reprinted below):

§ 1.56 Duty to disclose information material to patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim;

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application:

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Please direct all correspondence in this case to Merchant & Gould P.C. at the address indicated below:

Merchant & Gould P.C.
P.O. Box 2903
Minneapolis, MN 55402-0903



I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-030 0 1	Full Name Of Inventor	Family Name <u>NORDVALL</u>	First Given Name <u>Per</u>	Second Given Name
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Signature of Inventor 201: <i>Per Nordvall</i>			Date: <i>020117</i>	

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